

90646



906460



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA



For Supervisor's use only

## Level 3 Statistics and Modelling, 2010

### 90646 Use probability distribution models to solve straightforward problems

Credits: Four

9.30 am Monday 15 November 2010

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

**Make sure you have a copy of the Formulae and Tables Booklet L3–STATF.**

You should answer ALL the questions in this booklet.

Show ALL working for ALL questions.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–6 in the correct order and that none of these pages is blank.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**

For Assessor's use only		Achievement Criteria	
Achievement		Achievement with Merit	Achievement with Excellence
Use probability distribution models to solve straightforward problems.	<input type="checkbox"/>	Use probability distribution models to solve problems.	<input type="checkbox"/>
			Use and justify probability distribution models to solve complex problems.
Overall Level of Performance		<input type="checkbox"/>	

You are advised to spend 45 minutes answering the questions in this booklet.

Assessor's  
use only

### QUESTION ONE

A farmer grows sweet corn and each year sets aside one row of sweet corn for his local school. The farmer gives to the school each sweet corn cob in that row that is more than 18 cm in length. The sweet corn the farmer is growing produces corn cobs that are assumed to be normally distributed with a mean length of 19.3 cm and a standard deviation of 1.34 cm.

- (a) Find the percentage of the sweet corn cobs from that row that will be given to the school.

---

---

---

---

---

---

---

- (b) The farmer finds that insects have damaged 5% of all the sweet corn cobs grown and therefore these damaged sweet corn cobs will be unable to be given to the school.

Find the probability that in the next 10 sweet corn cobs the farmer picks, at least 3 cobs will not be able to be given to the school because of insect damage.

---

---

---

---

---

---

---

- Find the probability that the time spent picking the sweet corn cobs is greater than the time spent packing the sweet corn cobs.

[illegible]

**QUESTION TWO**

- (a) The maintenance record of a tractor shows that it has been operating for 50 months. During this period, the tractor has broken down on 20 separate occasions.

Calculate the probability that in the next month the tractor will break down on fewer than 2 occasions.

---

---

---

---

---

---

---

---

- (b) The farmer in Question One also grows onions. The onions are planted in rows which are 50 metres long. The farmer needs to know the number of onions that will be diseased. To investigate this, the farmer divides one row of onions in a paddock into 5 sections, each 10 metres long, and counts the number of diseased onions in each section.

	1st section	2nd section	3rd section	4th section	5th section
<b>Number of diseased onions</b>	13	17	9	9	12

Use the information in the table above to find the probability that, in a **5 metre section**, more than 4 onions will be diseased.

---

---

---

---

---

---

---

---

- Find the expected number of workers calling in sick each day of onion harvesting.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

**Extra paper for continuation of answers if required.  
Clearly number the question.**

Assessor's  
use only

Question  
number



